WHAT IS CLAIMED IS:

1. A reaction and regeneration system to effect radial flow contact of a reactant stream with catalyst particles movable as an annular-form bed through the system by gravity flow and to reduce stresses in the bed, the system which comprises:

a) a reactor having a catalyst retaining section, the catalyst retaining section being annular-form, the catalyst retaining section having an upper portion and a lower portion disposed below the upper portion;

b) a first catalyst inlet port in communication with the upper portion of the catalyst retaining section;

c) a first catalyst outlet port in communication with the lower portion of the catalyst retaining section;

d) a regeneration section to at least partially rejuvenate catalyst particles, the regeneration section being in communication with the first catalyst outlet port to receive catalyst particles from the catalyst retaining section and in communication with the first catalyst inlet port to introduce catalyst particles to the catalyst retaining section;

e) a second catalyst outlet port in communication with the lower portion of the catalyst-retaining section;

f) a second catalyst inlet port in communication with the upper portion of the catalyst-retaining section; and

g) a means for transferring catalyst from the second catalyst outlet port to the second catalyst inlet port, the means not being for introducing catalyst particles to the regeneration section, the means being in communication with the second catalyst outlet port and the second catalyst inlet port.

2. The system of claim 1 wherein the means for transferring catalyst comprises a non-mechanical valve.

3. The system of claim 1 wherein the means for transferring catalyst comprises a low impact diverter.

4. The system of claim 1 wherein the means for transferring catalyst is not for receiving catalyst particles from the catalyst regeneration section.

5. The system of claim 1 wherein the first inlet port and the second inlet port are the same port.

6. The system of claim 1 wherein the first outlet port and the second outlet port are the same port.

7. The system of claim 1 wherein the catalyst retaining section has a capacity of retaining a quantity of catalyst and the means for transferring catalyst has a capacity of transferring 3.5% of the quantity of catalyst in 12 hours or less.

8. The system of claim 1 further comprising a catalyst surge section, the catalyst surge section being in communication with the second catalyst inlet port to receive catalyst particles from the means for transferring catalyst and with the

upper portion of the catalyst-retaining section to introduce catalyst particles by gravity flow to the catalyst retaining section.

9. The system of claim 1 further comprising a catalyst surge section, the catalyst surge section being in communication with the means for transferring catalyst and with the second catalyst inlet port to introduce catalyst particles by gravity flow to the catalyst retaining section.

10. The system of claim 1 further characterized in that the chamber has at least two vertically spaced apart reactor sections and at least the lower of the at least two reactor sections comprises the outer catalyst retaining screen, the inner catalyst retaining screen, the catalyst retaining section, the reactant inlet port, the reactant outlet port, the first catalyst outlet port, and a means for transferring catalyst from the upper of the at least two reactor sections to the lower of the at least two reactor sections.

11. A reaction and regeneration system to effect radial flow contact of a reactant stream with catalyst particles movable as an annular-form bed through the system by gravity flow and to reduce stresses in the bed, the system which comprises:

a) a chamber having vertical chamber walls, the chamber being vertically elongated and confined;

b) an outer catalyst retaining screen disposed within the chamber, the outer catalyst retaining screen being vertically positioned and tubular-form;

c) an inner catalyst retaining screen coaxially disposed within the outer catalyst retaining screen to form a catalyst retaining section, the inner catalyst retaining screen being enclosed and tubular-form, the catalyst retaining section being annular-form, the catalyst retaining section having an outer manifold space around the exterior thereof as defined by the chamber walls and the outer catalyst retaining screen, the catalyst retaining section having an inner manifold space defined by the inner catalyst retaining screen, the catalyst retaining section being around the exterior of the inner manifold space, the catalyst retaining section having an upper portion defined by the inner and outer catalyst retaining screens, and a lower portion defined by the inner and outer catalyst retaining screens disposed below the upper portion;

d) a reactant inlet port in communication with the outer manifold space;

e) a reactant outlet port in communication with the inner manifold space;

f) a first catalyst inlet port in communication with the upper portion of the catalyst retaining section;

g) a first catalyst outlet port in communication with the lower portion of the catalyst retaining section;

h) a regeneration section to at least partially rejuvenate catalyst particles, the regeneration section being in communication with the first catalyst outlet port to receive catalyst particles from the catalyst retaining section

and in communication with the first catalyst inlet port to introduce catalyst particles to the catalyst retaining section;

i) a second catalyst outlet port in communication with the lower portion of the catalyst-retaining section;

j) a second catalyst inlet port in communication with the upper portion of the catalyst-retaining section; and

k) a means for transferring catalyst from the second catalyst outlet port to the second catalyst inlet port, the means not being for introducing catalyst particles to the regeneration section, the means being in communication with the second catalyst outlet port and the second catalyst inlet port.